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THE MONIST.

PSYCHOLOGY OF CONCEPTION.

GENERAL *Nature of Thought*.—The processes marked off by the psychologist as thinking or thought constitute the highest stage of intellectual elaboration (intellection). By taking our concrete percepts and resolving them into so many abstractions, (qualities or attributes of things, relations between things,) we are enabled to carry out the process of cognition to the furthest point of unification. As long as we view a particular object, or an event, alone apart from other things, we merely *apprehend* it. But when we bring it into relation to kindred things we *comprehend* it. Thus, we comprehend the tiger by classing it with other members of the feline group. So we comprehend or understand the movement of the steam-engine by assimilating it to the more familiar action of the steam in the kettle in forcing up the lid.

Like imaginative production thinking is nothing but the sum of processes of separation and combination, carried out on sense-material. But in this case the elaborative processes assume a new and peculiar form. It is one thing to build up a pictorial image as the poet does, another thing to elaborate an abstract idea, such as the scientific notion of force, fulcrum, and so forth. We must now try to investigate more thoroughly the nature of this thought-elaboration.

Thought as Activity.—It is evident that the processes here roughly described are active processes, that is to say they involve a special exertion of the forces of attention. In perception, repro

duction, and constructive imagination, this active factor is at work. But it is only in thought proper that this activity becomes fully developed. To think of a particular attribute in an object, say the color of a rose, is as we all know a conscious effort or strain. A child first called upon to think about abstract qualities, and the general relations of objects finds the operation difficult and fatiguing. All thinking is in truth an exercise of the higher form of attention, viz. volitional concentration of consciousness. We only think when we have some purpose as the discovery of the likeness or difference among objects, and such a purpose only develops itself as the individual and the race attain a certain measure of development or culture. The child and the savage, like the animal, get on very well without thinking. And even a large proportion of civilised adults think only in an occasional and rudimentary way. Thought is thus in all cases a kind of artificial activity sustained only for short periods and under the stress of impulses or motives which belong to a high stage of intellectual and moral development.

The high degree of activity in thought presumably involves a special amount of that muscular strain which forms the sensuous base of the attitude of attention. To think is thus to concentrate consciousness by aid of energetic motor adjustments. These include the innervation of certain muscles, more particularly those by which movements of the eyes and head are carried out. To think is to keep certain ideational elements in persistent consciousness, and this is probably effected in part at least by an energetic and sustained innervation of particular groups of muscles. To this it may be added that since as we shall see presently all thinking is bringing together in their relations a number of ideational elements, the muscular activity in the case is of a specially difficult kind. Such special muscular efforts would probably effect a cutting off of other elements and so subserve that severe narrowing of consciousness which is so marked a feature in thought.

Directions of Thought-Activity.—This thought-activity may be viewed as having two aspects or as following two directions, which it may be well to view apart, even though, as we shall presently see, they are inseparable aspects of one process. Just as all intellectual elaboration is at once differentiation or separation and integration

or combination of what is differentiated, so thought itself is but a higher development of each phase.

a) Analysis, Abstraction.—First of all, then, thought may be viewed as a carrying further and into higher forms the process of differentiation or separation of presentative elements by means of isolating acts of attention. Thus on selectively considering the color of a rose, or the form of a crystal, we are it is evident differentiating what is given in perception as a complex into a number of parts, and rendering one of these specially prominent and distinct. Such thought-separation is commonly spoken of as Analysis, i. e. the taking apart of what is conjoined in a whole, and also as Abstraction or the withdrawal of attention from what is for the moment irrelevant and confining it to one particular point, feature, or quality (Latin *ab* or *abs*, and *traho*).

Here it is evident a special attitude and effort of attention is required. It is one thing to note carefully a presentative complex just as it is, another thing to single out some element of this and fix the attention on it. The peculiar difficulty of this analytic attention is due to the firm coherence of the complex. The child cannot see the color of the orange just because the orange as a whole stands in the way. Hence this analytic attention is abstraction in the fullest sense, that is a deliberate turning aside from what stimulates or attracts this attention at the moment.

Such abstract singling out of an element may be supposed to involve a special modification of the muscular adjustment in attention. Hence perhaps the comparative ease with which we can single out for observation locally distinct features of an object, to which correspond different movements of the sense-organ. On the other hand the great difficulty of mentally separating the color from the form of an object may arise from the common element in the muscular adjustments concerned.

The nature of this process of analysis or abstract attention is best seen in those comparatively simple operations in which an actual presentation-complex as a group of tones or colors is being analysed. The carrying out of such a process of analysis is aided by certain conditions objective or external, and subjective or in-

ternal. Thus it is found that the closer the degree of the complication the more difficult the isolating fixation. Thus while it is comparatively easy to attend to one detail of color in an object locally separated from other color-details it is exceedingly difficult to attend to the brightness or the degree of saturation of a color apart from the quality of the tone itself. In the case of tone-masses, again, it is found that certain combinations, more especially that of the octave, are difficult to distinguish because of the tendency in this case to fusion.*

Coming now to subjective conditions we find that the detection of an element in a complex is aided by a previous familiarity with this apart from its present concomitants. Thus the singling out of the partial tones of a clang is greatly aided by the circumstance that these occur and so are known apart from the ground-tone and thus are more readily picked out and recognised.† Again, the separate detection of a presentative element is aided by special interest in the particular material. A fine ear for clang-effect or timbre can more readily fix its attention on this.

Such special interest works mainly through what is known as practice. What we are accustomed to note, and exercised in picking out from its surroundings, we are able to detect readily. This effect of practice in facilitating analysis or abstract attention to this and that constituent of a presentation-complex is abundantly shown throughout the whole domain of recent experimental inquiry into the nature and relations of sensation.

Of course all such analytical separation of presentative constituents is limited by certain conditions in our sensibility. Thus the limits of local discrimination obviously confine the range of isolating attention to local detail in our tactual and visual presentations. Since too such isolation is differentiation, i. e. the singling out of some trait or feature different in quality or intensity from sur-

* This is Stumpf's explanation. See his account of the different degrees of fusion. *Tonpsychologie* ii. p. 65, and p. 127 et seqq.

† According to Helmholtz this previous familiarity with the elements of a composite whole when it gives rise to a vivid expectation may produce an illusory analysis, as when certain opticians affirmed that they could detect the supposed constituents of green, blue, and yellow, in that color. See *Physiol. Optik*, p. 273.

rounding features, it follows that our abstraction is in all cases limited by our discrimination. We cannot separately fixate a local detail of color if this is not qualitatively distinguishable from its surroundings, nor a local detail of form if this is not distinguishable in luminous intensity from its entourage. Similarly with respect to the difficult analysis of complex tone-presentations or clangs and taste-presentations, as the mixed flavors of a dish.

b) Synthesis : Conscious Relating.—In the second place all thought is integrating or combining, or, as it is commonly expressed, a process of Synthesis. In thinking we never merely isolate or abstract. We analytically resolve the presentative complexes of our concrete experience only in order to establish certain relations among them. The most appropriate term for all such conscious relating or discernment of relation is Comparison.

All our sensational or presentative material is given in certain relations or connections, including the relation of coexistence, or coinherence in a substance, of the several qualities of a thing. Thus the several parts of an extended body stand in certain spatial relations one to another, one part being situated to the right of the other, and the object as a whole being above and behind another object, and so forth. To these space-relations must be added the time-relations of all events, such as the movements of objects, their changes of form, and so forth. Lastly with these 'external' relations are given the so-called 'internal' relations of difference and likeness. The colors, forms, and so forth that present themselves from time to time exhibit a large variety of such relations.

As long as we perceive or imagine the concrete object as such we have only a vague 'implicit' knowledge of these relations. Thus a child in looking at a house sees *implicitly* the chimney in a definite spatial relation to the mass of the building, but the clear explicit grasp of the relation is a subsequent process going beyond perception and involving a rudiment of what we mark off as thought. In like manner when in recollection we recall a sequence of experiences, we may implicitly recognise one as following another; yet it is only by a process of thought that we explicitly single out this relation for special consideration.

The same holds good with regard to the all-comprehensive re-

lations of dissimilarity and similarity. A child in perceiving a particular object, say a tree, differentiates it from surrounding objects, other trees, the background of the sky, etc., and in recognising a familiar object as his toy, or as an orange, he assimilates it to previous like presentations. But in these cases the consciousness of difference and likeness is implicit only. It is some way from this implicit or unconscious discrimination and assimilation to comparison proper, issuing in a clear or explicit consciousness of a relation of likeness or of unlikeness.

It follows from this that thought grows by insensible gradations out of the lower intellective operations. The perception of objects in space, and still more, the recollection of events in time, is itself an incipient subconscious stage of the thought process, i. e. grasp of relations. Hence our demarcations of the spheres of sense and thought, of concrete or pictorial and abstract representations, are not to be taken absolutely. The germ of thought is present throughout, yet as we shall see presently it is a considerable step from the implicit to the explicit seizing of these relations.*

All such explicit grasp of relation involves a new direction of adjustive effort, or of (volitional) attention. Just as the analytic resolution of a complex demands a special effort in the way of limited concentration and resistance to irrelevant concomitants, so the comparison of two presentations in order to discern their relation imposes a further special task in the shape of a comprehensive grasp. The special difficulties of the process are manifest. Comparative attention to two presentations, say two colors in local, or two tones in temporal juxtaposition is not merely the carrying out of a simple adjustive process in one direction only, but the carrying out of a double and yet co-ordinated adjustive process.

The fact that there is a general tendency to simple modes of adjustment subserving a comparatively simple structure or pattern of consciousness, and the fact that complex simultaneous adjustments, as in the case of doing different things at the same time, and in that of the synthetic relating process of thought, are rare and acquired with difficulty, suggest that a special nervous process is involved,

* Cf. Lotze, *Mikrokosmos*, English translation, i. p. 655; Ward, article "Psychology," *Encycl. Britannica*, p. 75.

consisting of a double and divergent stream of innervation, each branch of which has to be kept going in certain relations of time, as also of proportionate strength, with the other branch.

The process of synthetic or relating activity just described may take the direction of consciously grasping the relations immediately presented along with presentation, and more particularly the co-existence of attributes in the same object, and the space and time relations of presentations. To note the juxtaposition of yellow and white in a daisy or the co-existence of its form and color, or the spatial inclusion of its yellow centre in an extended whole, is evidently to discern relations and so to carry out a process of conscious synthesis.

It is however in discerning the most comprehensive relations of likeness and unlikeness that thought shows itself most clearly to be a synthetic process. Thinking has in a special manner to do with the detection of similarity and dissimilarity or difference. Such relating by way of difference or agreement is what we ordinarily understand by comparison.

The relations of similarity and dissimilarity as comprehensive relations connecting presentations remote as well as proximate in time are spoken of as internal and thus marked off from the external relations of time and place. It is true as we have just seen that they are involved along with the latter. Thus in discerning the relations of the parts of an object, we must differentiate them. Yet the two modes of relating are distinct. I discriminate two colors in local juxtaposition not *quid* juxtaposed but *quid* different in their quality. The juxtaposition may greatly assist the discriminative process, but this circumstance does not make the juxtaposition and the qualitative difference one whit less distinct as relations.

It may be added that the greater comprehensiveness of the so-called internal relations is seen in the circumstance that the relations of time and place, just like the separate qualities or attributes of objects, are themselves modes of similarity and dissimilarity. Thus the relation of local contiguity between two elements is something *common* to these and other contiguous pairs. Moreover, it is evident that in such a case each element is recognised as having a different position from the other. Similarity with the temporal relations of events.

Comparison.—We may now glance at the operations here brought

under the head of comparison, the bringing of different presentative or representative materials before the mind simultaneously and keeping them in consciousness in order to note their relations of similarity or dissimilarity. Here as in the case of Analysis or Abstraction we shall illustrate the process by selecting relatively simple modes of the operation carried out on immediately presented sense-material.

Likeness and Difference.—We may here assume that likeness and unlikeness are two perfectly distinct relations. To apprehend a similarity between two sensations, say tones, is an intellectual process which we all recognise as radically unlike that of apprehending a difference.

Yet while the consciousness of likeness and that of difference are thus radically distinct, as psychical processes, it is evident that the relations of likeness and difference are presented together in close connection. As we all know similarity discloses itself in the midst of difference. This is obvious in the case of all complex presentations, as when we assimilate two objects on the ground of a color resemblance. Not only so, since even in the case of sensation-elements (e. g. color-sensations) likeness is a thing of degree shading off from perfect likeness or indistinguishableness to just recognisable affinity, it follows that here, too, likeness and difference are given together in mutual implication.

Since resemblance and difference are thus uniformly presented together, it is to be expected that comparison will commonly include the two processes, assimilation and discrimination. And this is so. We see likeness amid difference, e. g. a common trait in two faces along with striking dissimilarities. On the other hand we contrast two objects in respect of some *common* quality as color, form, beauty and so forth, which common element constitutes the ground or *fundamentum* of the comparison.

At the same time it is evident that the one process usually, if not in all cases, preponderates over the other. We are now specially interested in the likeness of two objects, say two faces, or two literary styles, the moment after, perhaps, in their differences. Accordingly we may say that comparison is the noting of likeness

against a dimly apprehended background of difference, or a difference against a dimly apprehended background of similarity.

Conditions of Comparison.—Comparison whether specially directed to likeness or unlikeness has certain common conditions. As in the case of Abstraction these conditions may be divided into objective, or those involved in the nature or concomitants of the presentations considered as external objects, or objects of common perception; and subjective or those connected with the nature of the individual mind. As I have given a full account* of these elsewhere, I must content myself here with a general remark or two on the subject.

Of the objective conditions the most important are the following: (*a*) There must be a moderate and favorable degree of strength or intensity in the presentations to be compared. We compare fairly bright colors better than very dull ones. (*b*) The common factor or *ground* of comparison must be sufficiently distinct. We cannot compare two tones in respect of pitch if this is unsteady. (*c*) Comparison is greatly aided by juxtaposition in space or time. Thus local proximity is a condition of a nice comparison of colors. With respect to temporal conditions it was found by Fechner and has been confirmed by others that immediate succession is more helpful to comparison than simultaneity. We compare sensations of weight, tone, etc., best of all when they are made to succeed one another.

With respect to subjective conditions, comparison will, it is obvious, be assisted by a good power of concentration. It will also be aided by a special sensibility for, and interest in, the particular sensuous material: witness the musician's comparison of tones as to pitch, purity, etc. Lastly reference may be made to special preparation or mental preadjustment. It is manifest that if we are expecting to see two things like one another we shall in general be more disposed to do so; similarly if we are on the lookout for difference.

It may be added that there is a special interest in likeness *as such*, and also in difference. Such interest predisposes a person to

* In *Mind*, x. p. 489 et seqq.

detect the one relation rather than the other. Hence the familiar observation that some people are particularly acute in seeing likenesses, e. g. in faces, whereas others are habitually more observant of differences.

Connection between Analysis and Comparison.—There is a close connection between the two directions of thought-activity just dealt with. To begin with, it has become evident that in the processes of comparison, analysis is always involved. Sometimes the analysis seems to precede the comparison, as when we are asked to compare two flowers in respect of their color. In other cases it appears rather as the result of comparison. Thus it is by successive comparisons of different members of a class of things, as flowers, that we gradually come to analyse out the common features of the group.

While comparison thus involves abstraction, abstraction even in the case of a single object may be said to involve the rudiments of comparison. Thus in analytically singling out for consideration the spherical form of a rain drop, we implicitly and subconsciously assimilate it to other previously known spherical objects. But for this vague imperfect accompaniment of assimilation, the analytic separation of the constituent would be difficult if not impossible. Such a subconscious reference to one or more similar things helps to direct the operation of analysis by intensifying and rendering prominent for the moment the particular constituent assimilated through the addition of an ideational element to the sensation.*

It follows that the thought-process is one process having two aspects or distinguishable factors. Either of these may become predominant according to special circumstances. In this way we obtain two varieties of operation, viz. Analysis or Abstraction, in which the recognition of likeness is subconscious, and Assimilative Comparison where the process of analysis is preliminary and subordinate to a conscious apprehension of likeness.

A somewhat like relation holds between analysis as a subconscious process of differentiation and a conscious act of discrimination. Thus in analysing a clang we must, agreeably to what was

* This is well brought out by W. James, *Principles of Psychology*, i. p. 434 et seqq.

said above, have a vague impression of the difference between one tone and another. And such subconscious differentiation readily becomes the starting-point in a full conscious apprehension by an act of comparing attention of the differences between the several ingredients.*

Thus far we have been occupied with the two fundamental processes in thought and we have illustrated these in their simplest form as employed about presentations or their equivalents, concrete representations. But as already pointed out what we mean by thought is the representation of things as classes or generalities. All the more interesting and momentous problems relating to thought, such as the question whether the lower animals think or reason as we do, have reference to such *general* thinking. We have now to examine the processes involved in this thinking.

These fully developed thought-processes are marked off by the use of what is known as the general idea or notion such as *man* or *virtue*. Such general ideas when reduced to a precise form as by the logician are spoken of as concepts. And since the science of logic assumes thinking to take place by help of such conceptual products we may also speak of these full or explicit thought-processes as Conceptual Thought.†

General Ideas and their Formation.—In seeking to trace the development of this general thinking we have first of all to consider the nature and origin of general ideas. It is evident that we only think about things generally in a distinct manner when we are able to form such ideas. Thus I cannot think out the proposition 'The mushroom is a fungus' until I am able to form the general ideas mushroom and fungus. The difficult problems respecting the nature of thought, its relation to language, and its extension beyond man

* Stumpf uses the term Analysis for the mere vague detection of plurality of elements in a sensation-complex which he considers to be distinct from, and preliminary to a discrimination of them as different one from the other. *Tonpsychologie* ii. p. 104 et seqq.

† The use of such expressions must not, however, blind us to the fact that a concept strictly speaking is something logical, an *ideal* form of the general idea rarely if ever realised in our actual thinking processes. Of this more presently.

to the lower animals, have been discussed in close connection with the nature and origin of general ideas.

A general idea may for our present purpose be defined as an idea having a general import or reference. Thus a child's idea of dog, home, or father, becomes general when he consciously employs the term as the sign of this, that, and any other particular object which may answer to a certain description or be found to present certain characteristic attributes or traits; or, as the logicians express it, a general idea is a representation of a general class of things.*

Now it is evident that general ideas as thus defined are reached slowly and by degrees. It is exceedingly doubtful whether any of the lower animals possess them. The baby does not possess them and even after attaining to speech remains for a long time with only the rudiments of them. In their perfected articulate form as required for exact scientific thought they are confined to a few highly trained minds.

Generic Images.—The first stage in the formation of such general ideas is the welding together of a number of concrete images into what has been called a generic image. The idea tree or house may be taken as an example. Such generic images appear to be formed by a process of assimilative cumulation. Let us suppose that a child after observing one dog, sees a second. In this case the strong resemblance in the second to the first effects a process of assimilation analogous to automatic or "unconscious" assimilation. That is to say, the percept corresponding to the second animal is instantly fused with the surviving image of the first by reason of easily apprehended points of likeness. By such successive assimilations a cumulative effect is produced which has been likened to that

* The reader must be careful to distinguish the meaning of the term class as here used from its meaning when applied to a definite number of objects viewed as a collection, as a class of children in a school. In thinking of man as a (logical) class I do not represent a definite number at all; nor do I represent men as a collection. It would be more correct to say that I am representing in a more or less distinct way the fact that this, that, and an indefinite list of other things are related as like or answering to one description. How this mode of representation is effected will appear presently.

of the superposition of a number of photographic impressions received from different members of a class, (e. g. criminal,) whereby common features get accentuated and so a typical form is produced.*

Such a process of deepening and accentuating common traits and effacing individual or variable ones can only be looked on as a tendency never perfectly fulfilled. Interesting differences would in all cases tend to reinstate themselves. Thus my own generic image of a church happens to be a building with a tall-spire, because the finest church in my native town was of this form. Recent examples would also tend to contribute variable peculiarities. Thus the baby's generic image of a dog might have the distinguishing characters of the dog last seen.

This process of cumulative assimilation would be largely passive and independent of those active processes of comparison, just described. It would further be capable of being carried forward (to some extent at least) independently of language. Hence we may, with some degree of confidence, attribute generic images to the child before he comes to the use of words and to many of the lower animals. Thus it is highly probable that a baby of six months forms a generic image of the human face out of the percepts answering to its mother's face, nurse's face, etc., and that when suffering from loneliness it has this image in its mind. Similarly a predatory animal may be supposed to compound a generic image out of the percepts gained from this, that, and the other specimen of his prey, so that when seized with hunger, this typical image is recalled.

In order to illustrate what is meant by a generic image, it is important to take the case of a pure representation detached from a presentation. Thus we cannot say that because a diving bird recognises a new sheet of water, it must have at the moment, a generic image answering to water. The recognition of a thing does not imply a distinct representation of the thing as previously seen. The presentative and representative ingredients are fused in this

* For an account of such composite photographic pictures, and their analogy to generic (mental) images, see Mr. F. Galton's *Inquiries into Human Faculty*. Appendix, "Generic Images."

case, or to express it otherwise, the image is latent and undeveloped. Similarly with respect to such rudimentary processes of conception or general ideation as those here considered. We can only attribute a developed and detached generic image to baby or animal when we have reason to think that these occur in the absence of percepts, e. g. in states of desire, in dreams, and so forth.*

Relation of Generic Image to General Idea.—The question still remains how far such generic images are, properly speaking, *general* ideas in the sense defined above. Is, for example, the typical face that is pictured by the lonely infant thought of as something common to this, that, and the other concrete object? Does it carry with it any clear consciousness of a general class of things? There is no certain proof that this is so. It must be remembered here that the mental image corresponding to one and the same individual object, as the infant's mother, is composite also and in the same way as the generic image. Thus the baby forms the image of its mother out of a number of practically unlike percepts, corresponding to varying appearances of the object in different positions, different light, different dress, and so forth.† Generic images accordingly differ not in kind, but only in degree (viz. proportion of common to variable feature taken up and accentuated) from particular or concrete images. And so long as they remain merely pictorial *images*, there seems no reason to attribute to them any general function or import.

The true process of conception, as generalisation or general ideation, that is a conscious representation of something as common to many as distinguished from one, involves the active processes of thought, analysis and synthesis, abstraction and comparison. It is only when the child begins consciously to break up its images to mark off this element or feature from that, and by help of such analysis discerns and demarcates common features that general thought properly so called, appears. In this way it reaches a dis-

* The argument in support of the proposition that generic images, or (as the writer calls them) "recepts" are actually reached by the lower animals is ably set forth by Dr. Romanes, *Mental Evolution in Man*, p. 51 et seqq.

† Cf. Taine, *On Intelligence*, Part i, Book ii, Ch. 2.

tinct idea at once of an individual thing and of general or common aspects among individuals. We have now to examine into this true thought-process.

Transition to Conception Proper.—The transition from merely imagining to thinking proper is effected by processes of reflective attention in which abstraction and comparison play a chief part. In order to understand how this occurs we may suppose the process of automatic assimilation checked by the introduction of some impressive difference. Thus a child proceeds to play with a visitor's dog and finds it wanting in the friendly sentiments of his own pet. Here difference which, in the earlier stage of automatic assimilation, remained indistinct in the background of consciousness, is brought forward. The unlikeness of *morale* in spite of the likeness of *physique* is forced on his attention, the present percept is separated from and opposed to the image, and a step is taken in marking off likeness from surrounding difference.

As differences thus come into distinct view and impress themselves on the mind as the constant accompaniment of likenesses, a new and explicit grasp of likeness-in-difference ensues. This starts from a mental separation of the several perceptual constituents of the generic image, and a reflective comparison of these one with another, so as to demarcate common features or likenesses from peculiar features or unlikeness. Such comparison, or series of comparisons, begins with incomplete analysis and vague apprehension of likeness and ends in a more complete analysis and more definite apprehension of likeness. In this way, for example, the child waking up to differences among apples, goes back on his various experiences, and by noticing and setting aside variability of taste, size, etc., gets a clear grasp of the common essential features. Such a conscious active separation of definite points of resemblance from among a confusing mass of difference is what psychologists and logicians more especially mean by Abstraction.

Differentiation of Notions of Individual and Class.—As was pointed out just now the coexistence of likeness with unlikeness in the child's experience, may mean one of two things, viz. persistence or identity of one individual object, in spite of certain changes, or a

general similarity among a number of different individuals. The process of conception is sometimes described as if the child started with a definite knowledge of individuals and then proceeded to generalise or form a class-idea. There is, however, every reason for saying that the two modes of interpreting likeness-in-difference are reached concurrently and by processes largely similar. Thus it seems most reasonable to suppose that the baby which 'da-das' every bearded person it sees is as yet clearly conscious neither of individuality nor of generality. In other words we must not assume that it is stupidly confounding its sire with a stranger, or, on the other hand, forming an idea of a general class. At this stage the child merely recognises certain interesting similarities and proceeds to express the fact. We have to suppose that the clear apprehension of individual sameness is reached but slowly and in close connection with the first clear consciousness of different things attached by a bond of likeness.

To say that the child's knowledge begins with the concrete individual is not to say that it attains a clear consciousness of what we mean by an individual thing persisting and the same (in spite of change) before it begins to generalise. We must remember that the cognition of a thing as persistent and continuous is the result of lengthy and complex processes of comparative reflection. To individualise is thus to think just as to generalise is to think.* In truth, the psychological development of the idea of individuality proceeds along with that of generality, each being grasped as a different way of interpreting partial similarity among our percepts.†

The Process of Generalisation.—When once this differentiation of the individual idea from the class idea has advanced far enough the process of generalisation proper, or the grasp of common or general qualities, is able to be carried out in the way usually described by psychologists. That is to say, a number of individual things, rep-

* Hence the logician can speak of the idea answering to a proper name as a singular *concept*. See Lotze, *Logic*, p. 34.

† The question of the priority in the individual of the knowledge of the individual or of the general class, the question known as the *primum cognitum* has been much discussed in connection with the linguistic problem whether names are first used as proper names or as general names.

resented as such, are now compared, the attention withdrawn by a volitional effort, from points of difference and concentrated on points of likeness (abstraction) and so a true process of generalisation carried out.

The common account of the process of conception here followed, as a sequence of three stages, Comparison, Abstraction, and Generalisation, rather describes the ideal form of the process as required by logic than the mental process actually carried out. As we saw above a vague analysis or abstraction precedes that methodical comparison of things by which the abstraction becomes precise and perfect, that is to say, definite points of likeness (or unlikeness) are detected. With regard to generalisation it has been pointed out that a rudimentary form of this process is involved in abstraction. To see the roundness of the ball is vaguely and implicitly to assimilate the ball to other round objects. It is to be added that an imperfect grasp of general features as such (commonly) precedes the methodical process here described. The child realises in a measure, the general function of the name 'horse' before he carries out a careful comparative analysis of the horse-characters. At the same time the use of the word generalisation is important, as marking off the clear mental grasp of the class-idea as such, that is the idea of an indeterminate number, of objects, known and unknown, answering to a certain description.*

Conception and Naming.—We have so far supposed that the processes of conception are carried out without any help from language. But it is exceedingly doubtful whether any such orderly process as that just described, the comparison of a number of percepts and the marking off of common attributes could be carried out without the aid of words or some equivalent. It is probable that even the clear grasp of individual things as unities and as permanent identical things, depends on the use of a name (proper name) which as one and the same sound seems to mark in an emphatic way the continued oneness of the object.† And the same applies still more manifestly to the apprehension of a general class of things. It is

* On the relation of Abstraction to Generalisation see Hamilton's *Lectures*, Vol. ii, Lec. xxxv.

† It seems to follow that animals cannot attain the clear consciousness of individual things as permanent unities, as we attain it.

certain that in later life at least all clear general thinking takes place by help of language. The general idea is held together, and retained by means of a name; and, as already pointed out, it is very uncertain whether in the absence of such general signs, the infant or the lower animal ever attains to a clear consciousness of the 'one in the many,' the common aspect of a number of different objects.

Is Generalisation Possible Without Language?—The question how far we can generalise or form a general idea apart from the use of names or other signs is one of the standing *cruces* in psychology. If we judge by introspective examination of our own minds we do no doubt now and again carry on processes of thought of a quasi-general character with little if any help from words. Yet it is doubtful whether we attain a clear consciousness of the *generality* of our thinking in this case. It must be remembered too that even if we can, as is alleged, employ a particular image or succession of images as representative of generalities without any aid from language (as when we intuitively follow the proof of a particular case in geometry and at the same time recognise its general validity) we are employing powers of thought that have been developed by help of language.*

If now we turn from the developed to the undeveloped mind, and ask whether children think apart from the use of language, we find the question exceedingly difficult. It has been alleged that a born mute reached prior to his mastery of a deaf-mute language the highly abstract idea of maker or creator and applied this to the world or sum of objects about him.† It must be borne in mind however, that born mutes make a certain spontaneous use of articulate sounds or signs, and such articulations, though unintelligible to others, and not even heard by themselves, may be of great assistance in carrying out the process of Abstraction. It must be further remembered that a child understands others' words and may probably make some internal use of them as signs before he proceeds to imitatively articulate them.

Lastly with respect to the lower animals, while it must be admitted that they display something closely resembling the germ of general thinking, it is manifest that we cannot in their case, be cer-

* On the nature of such speechless thought see Venn, *Empirical Logic*, p. 147.

† See a very interesting account of the experience of a born mute by Prof. S. Porter, in an article "Is Thought Possible without Language?" in the *Princeton Review*, January, 1881.

tain of the degree of clear consciousness of generality attained. The actions of a fox caught in a difficulty and inventing a way of escape seem indistinguishable from those of a man thinking by help of general ideas and general rules: yet the mental process may after all be non-ceptual, and pictorial. It seems safe therefore to conclude that apart from verbal or other general signs the full consciousness of generality does not arise.*

Psychological Function of General Names.—A name is commonly defined as a mark or sign by the help of which the idea of a thing may be called up in our own mind or in the mind of another. Signs are either self-explaining, as in the case of a drawing, or an imitative gesture, or conventionally attached to objects as the larger number of linguistic signs or names, the symbols used in music, etc.† Language signs consist either of articulated sounds or other percept-producing movements, as the finger movements‡ used by the deaf and dumb.

A name may be given to one thing (proper name) or to a general class (common or general name). In either case, as explained above, the name psychologically considered is the expression or indication of a similarity among our percepts. To name a thing is thus the outward manifestation of a process of assimilation.

The name (articulation-sound complex) becomes attached to the idea it stands for by a process of contiguous integration. Looking at it as accompanying and perfecting the process of assimilation, we may say that a name, whether as employed by ourselves or as heard used by others, becomes specially associated with, and so expressive of, some similar feature or features of our perceptual experience. Thus the name 'home' specially emphasises the recurring or constant features of the child's surroundings, the name

*It must be remembered that some of the most intelligent of the lower animals, e. g. ants, have a system of tactual signs analogous to our language. On the whole subject of the germ of linguistic and conceptional power in animals, see Romanes, *Mental Evolution in Man*, Chap. v and following.

†Articulate sounds so far as imitative (onomatopoetic) words, are of course to be classed with self-explaining signs.

‡On the general function and the possible varieties of language-signs, tone-language, gesture-language, etc., see Romanes, *Mental Evolution in Man*, Chap. v and following. Cf. Venn, *Empirical Logic*, Chap. vi.

'horse' the common features of structure in the objects so named. The name thus becomes specially attached to, and so a mark of the effects of superposition of common presentative elements in our experience.

This is well brought out in Herbart's view that the general idea is the result of "apperception," or the coalescence of a new presentation with previous like representations (apperceptive masses). Such apperceptive fusion or assimilation would according to Herbart help to explain the prominence or distinct emergence of the common element in a new presentation, and the falling back of the particular or variable features into indistinct consciousness.*

Use of Names in Early Life.—In the beginning of life linguistic signs are used in close connection with the process of automatic assimilation. Thus the recurrence of the presentative complex answering to a particular animal as the dog, calls forth, by a process analogous to a reflex movement, the articulation, let us say, of the sound 'bow-wow.' This use of words by the child to mark likeness is partly spontaneous, partly imitative. As is well known, children often invent names of their own, as their pet names for nurse, doll, and so forth, and their names for classes of objects, as when one child used the sound 'mum' as a name of eatables, generally, and another, the sound 'appa' as a name for this, that, and the other animal (kitten, chick, etc.). They also spontaneously extend the use of names supplied by others as when the sound "ba" (ball) was extended to a bubble and other round objects. This spontaneous use of names gives place in time to an imitative use of names as heard by others.†

From what we said above we have to suppose that names are used at the beginning neither as proper or Singular, nor as General names. They merely serve to mark off and register common features of the child's experience. As the processes of comparison gain in strength and the difference between the individual and the gen-

* See Mr. Stout's account of Herbart's view. *Mind*, Vol. xiv. p. 15.

† For interesting illustrations of children's spontaneous invention, as also of their extension of names, see Preyer, *Die Seele des Kindes*, 3er Theil; Pérez, *The First Three Years of Childhood*, Chap. xii; Taine, *On Intelligence*, Book iv, Chap. i, § 1; and Darwin's *Notes* on his child, *Mind*, Vol. ii. p. 285, et seqq.

eral class becomes distinct, the two uses of names as singular and general grow clearly differentiated. Thus the names Charles, Papa, Rose, and so forth, come to be marks of particular things, those organised experience-unities which are thought of as having continued existence independently of our intermittent percepts. Similarly, the general name, dog, man, and so forth, come to be consciously applied to a number of such object-unities on the ground of common attributes.

How Names Further Conception.—At first we find this use of general names confined to classes of objects having numerous points of similarity and so easily representable in the pictorial form of Generic Image, as “dog,” “house,” etc. Here, as pointed out above, the name is not used with a clear consciousness of its general character or function. Yet the very application of one and the same name to a number of percepts is an important aid to those processes of reflective comparison and selection of common features by which the apprehension of generality arises. To begin with, any use of a name to mark the result of an assimilative process, serves to call attention to and to emphasise the existence of like features. Not only so, the name being applied to each of a number of percepts is a valuable means of recalling these together, and so furthering that extended process of comparing a number of things which underlies generalisation. More than this, since the name from the beginning serves to emphasise and register the fact of likeness, it greatly facilitates the subsequent careful analysis and definition of the points of likeness. Of special service here is the hearing of names applied by others to a variety of things, as when a multitude of unlike things are called ‘plants’ and so on. Such announcement of likeness as yet undiscovered by the child serves as we know as a powerful stimulus to a comparative examination of the things and this urges the child on along the conceptual path.

The greatest use of general names, however, in connection with general ideation or conception is in definitely marking off and rendering permanent each new result of analysis and comparison. Thus on reflecting upon dogs with a view to see in what exactly they do agree in spite of their differences, and on gradually gaining clear

consciousness of this, that, and the other characteristic features of form, action, etc., a child demarcates and definitely registers these results of abstraction by help of the name. That is to say, the name is used as a defining mark as one might mark off an ill-defined local feature in a piece of board by drawing a chalk circle about the spot. When the name is thus definitely and exclusively applied to such products of comparison and abstraction it henceforth serves as a means of recalling these and keeping them distinctly before the mind.

When thus definitely attached by association to the points of similarity singled out by abstraction from a number of particular objects, the name is used as a true general sign. The image now takes on a much more definite function as a typical or representative image, through the circumstance that by help of the demarcating sign certain of its features stand out distinctly, and are at the same time realised as belonging not merely to one particular thing, but to what we call a general class. Thus the name dog, though probably still calling up an image of a more or less concrete character, that is, including traits of some individual dog or variety of dogs, becomes a general sign inasmuch as it throws prominently forward, and so secures special attention to certain definitely apprehended common class-features (the common canine form, action of barking, etc.).*

Used now in this way as a general sign of certain definitely apprehended points of likeness or common qualities, the name acquires the double function attributed to it by logicians. That is to say, it *denotes* any one of a certain order or class of things: the class or group being determined in respect not of the number of things included, but only of the common qualification or description of its number, that is to say of the qualities which the name is said to *connote*.†

* Since the result of abstraction though representing concrete things does not represent them fully and explicitly we may, with Mr. Spencer, call the general or abstract idea a re-representation. See his *Principles of Psychology*, ii, p. 513.

† According to logicians a general name denotes certain things (members of a class) and connotes certain qualities in these things. For the terms denotation and

Formation of more Abstract Notions.—A similar process of comparison and abstraction clinched by a linguistic sign takes place in the formation of those general ideas which answer to few common qualities, and are altogether removed from the plane of the generic image, as for example 'animal.' It is obvious that we cannot compound a quasi-concrete image of animal as we can, roughly at least, compound an image of dog. There is no common form running through the vast variety of animals that renders this possible.* There is indeed an image-element here, for in thinking of animals most people probably image imperfectly one of the more familiar quadrupeds. Here the *general* representative function of the image is still more evident. A child cannot form the idea animal till he has attained a considerable skill in the use of verbal signs as general. For to represent animal (in general) is to repress the tendency to image particular concrete examples, and to give peculiar and exclusive prominence to a few properties, such as spontaneous movement, sensation, which can only be grasped by a special effort of abstraction; and can only be brought before the mind by the medium of a verbal sign.

These higher steps in the thought-process become possible by means of the verbally embodied results of the lower steps. It is after the child has formed the general ideas, dog, horse, and so forth, that he climbs to the more difficult, more comprehensive, and more abstract idea, animal. In this way, we may say with Hamilton, that language is to the mind what the arch is to the tunnel, the necessary precondition of all advanced thought-work.

It is not meant by this that the child progresses regularly from notions of a comparatively small range to more comprehensive ones. It must be remembered that it is often easier for a child to form an idea of a larger class or genus than of one of its constituent sub-classes or species, viz. when the form presents prominent easily discernible points of likeness, and when the distinctive features of the latter are obscure. Thus the child uses the name tree before

connotation those of extension and intension are often substituted. See Jevons, *Elementary Lessons on Logic*, Lesson v.

* Cf. Lotze, *Logic*, p. 38.

he uses the name oak-tree, and so forth. This is what is meant by saying that the child sees likenesses before he sees differences.

In this brief account of the name-embodied concept reference has been made only to those names which grammarians call nouns, and of these only to such as are names of things. By the same mental process by which the child reaches the idea orange, it reaches the idea yellow, round, and so forth. The clear use of adjectives as qualifying epithets marks a higher stage of analysis than the first use of names, viz. the separating out for special consideration of *single* qualities in things. Hence in the imitative speech of the child, the first use of adjectives follows by an appreciable interval that of names.* This separate apprehension of single qualities becomes still more distinct when abstract nouns such as whiteness, height, come to be used. As the etymology of such names shows they come after concrete names in the development of the thought of the race and community, and are invented by help of such concrete names. The individual only acquires the use of these abstract names when intelligence has developed under the stimulating and controlling influence of education.

It is only when analysis is thus carried up to the point of a separate consideration of single qualities that the class-notion, the representative of a *group* of qualities, becomes definite and concise. A perfectly clear general idea of a class means one of the constituent elements of which we can separately attend to and name.

Conception as Dependent on Social Environment.—It is evident from this brief sketch of the development of the general idea that it is a process that is largely dependent on the action of the social environment. Language is pre-eminently the invention and instrument of social life. It is the medium by which we communicate one to another our ideas, wishes, and so forth. In the early years of life the undeveloped intelligence of the child is continually roused to activity through his desire to enter into the system of language

* One or two adjectives as ni-ni (nice) are used along with nouns from the first, but these probably so far as names are on the level of nouns, i. e. names of things as concrete wholes. It must not be supposed however, that the child or the race begins with a clear apprehension of any one class of words. The several classes of words distinguished by the grammarian are confused at first and are only differentiated as intelligence advances. All that is meant here is, that the child knows and names things as concrete wholes before it begins to qualify them, or discern particular qualities in them. On the differentiation of nouns etc., in the early use of language, see Romanes, *Mental Evolution in Man*, p. 219 et seqq. and p. 295 et seqq.

which he finds others using. In this way the results of ages of thought-processes embodied in the language of educated men and women are brought to bear on the growing mind, and these constitute a main ingredient in the educational influence of the community upon the individual. The profound and far-reaching influence of this medium of common word-embodied ideas is clearly seen in the arrest of intellectual development when contact with the general mind through language is excluded, as in the case of neglected deaf-mutes. As Professor Huxley says, "A race of dumb men deprived of all communication with those who could speak would be little indeed removed from the brutes."*

J. SULLY.

* Quoted by Professor Horatio Hale, in *The Origin of Language*, p. 42.